Active Project (2014 - 2016)

AirCore Reusable InSitu Sampler for CO2 and Trace Gas Measurements, Phase II Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)

ABSTRACT

A novel design for an in situ air sampling sensor for CO2 and trace gases is proposed. The sensor, named AirCore, provides the advantages of existing in situ sensors (e.g. high resolution) but eliminates possible biases in analysis that often originate from imperfect measurement condition. The AirCore provides a significant savings in cost and weight while increasing the capabilities of existing in situ sensors. The AirCore system consists of the AirCore gas sampler and the support system to accomplish its high altitude (nominally 70,000+ ft.) mission. This support system includes the sensor launch and recovery components. The AirCore can be launched and recovered by a limited crew, which reduces the operational cost of the system.

ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: The proposed sensor can be used to provide "ground truth" information for several NASA initiatives on measurements of greenhouse and related gases in the atmosphere, including OCO2/ASCENDS, AURA/TES, and the TCCON sites. We propose to develop an AirCore sensor which will be hoisted aloft on a helium weather balloon to a nominal altitude of 70,000 ft. When the balloon reaches its target altitude, the payload (glider UAV plus AirCore sampler) will be released. The UAV (known as the Retriever) will then follow a prescribed spiraling descent path during which time the AirCore sampler will collect a continuous atmospheric sample. Upon UAV recovery, the AirCore sample will be analyzed.

To the commercial space industry:

Potential Non-NASA Commercial Applications: The sampler methodology can be used for air quality monitoring over cities, industrial and agricultural sites. The UAV can be used for high altitude communication relays (traditional radio and cell), weather parameter monitoring, aerial photography, cloud

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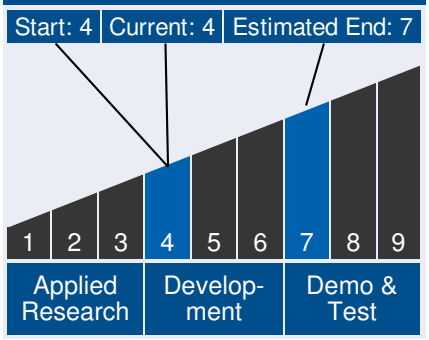
Technology Maturity



Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

Program Manager:

- Carlos Torrez

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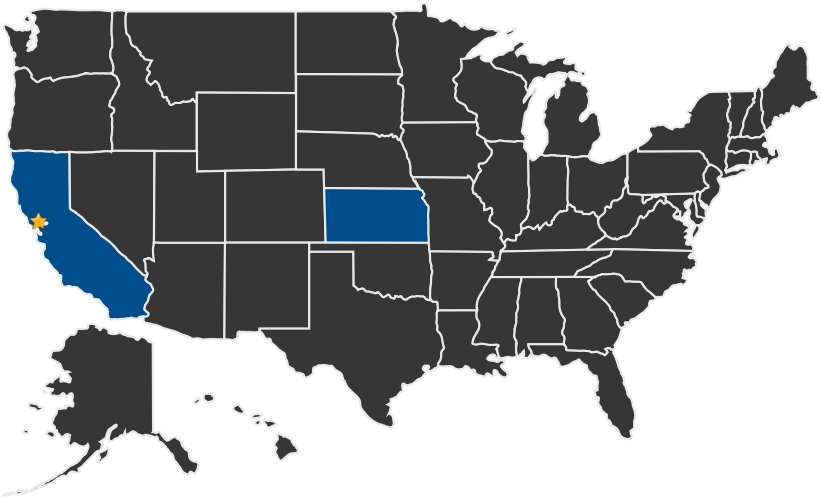
seeding, etc.

U.S. WORK LOCATIONS AND KEY PARTNERS



U.S. States With Work

Lead Center:
Ames Research Center

Other Organizations Performing Work:

- KALSCOTT Engineering, Inc. (Lawrence, KS)

PROJECT LIBRARY

Presentations

- Briefing Chart
  - (http://techport.nasa.gov:80/file/23081)

Management Team *(cont.)*

Project Manager:

- James Podolske

Principal Investigator:

- Thomas Sherwood

Technology Areas

Primary Technology Area:
Science Instruments, Observatories, and Sensor Systems (TA 8)
└ Remote Sensing Instruments and Sensors (TA 8.1)
└ Lasers (TA 8.1.5)
└ 0.765/1.572 µm Pulsed Laser (TA 8.1.5.5)

Secondary Technology Area:
Science Instruments, Observatories, and Sensor Systems (TA 8)
└ In-Situ Instruments and Sensors (TA 8.3)
└ In-Situ (other) (TA 8.3.3)

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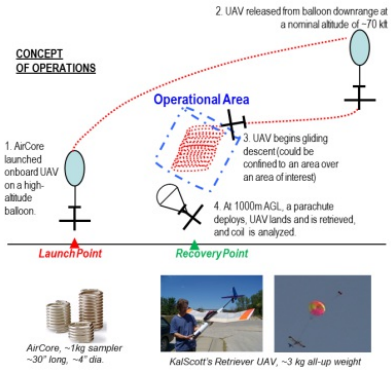
IMAGE GALLERY



AirCore Reusable InSitu Sampler for CO2 and Trace Gas Measurements, Phase II

DETAILS FOR TECHNOLOGY 1

Technology Title

AirCore Reusable InSitu Sampler for CO2 and Trace Gas Measurements

Potential Applications

The proposed sensor can be used to provide "ground truth" information for several NASA initiatives on measurements of greenhouse and related gases in the atmosphere, including OCO2/ASCENDS, AURA/TES, and the TCCON sites. We propose to develop an AirCore sensor which will be hoisted aloft on a helium weather balloon to a nominal altitude of 70,000 ft. When the balloon reaches its target altitude, the payload (glider UAV plus AirCore sampler) will be released. The UAV (known as the Retriever) will then follow a prescribed spiraling descent path during which time the AirCore sampler will collect a continuous atmospheric sample. Upon UAV recovery, the AirCore sample will be analyzed.